

# RD74LVC14B

## Hex Schmitt-trigger Inverters

REJ03D0218–0100Z

Rev.1.00

Apr.09.2004

### Description

The RD74LVC14B has six Schmitt trigger inverters in a 14-pin package. Low voltage and high-speed operation is suitable at the battery drive product (note type personal computer) and low power consumption extends the life of a battery for long time operation.

### Features

- $V_{CC} = 2.0\text{ V to }5.5\text{ V}$
- All inputs  $V_{IH}(\text{Max.}) = 5.5\text{ V}$  ( $@V_{CC} = 0\text{ V to }5.5\text{ V}$ )
- Typical  $V_{OL}$  ground bounce  $< 0.8\text{ V}$  ( $@V_{CC} = 3.3\text{ V}$ ,  $T_a = 25^\circ\text{C}$ )
- Typical  $V_{OH}$  undershoot  $> 2.0\text{ V}$  ( $@V_{CC} = 3.3\text{ V}$ ,  $T_a = 25^\circ\text{C}$ )
- High output current
  - $\pm 4\text{ mA}$  ( $@V_{CC} = 1.65\text{ V}$ )
  - $\pm 8\text{ mA}$  ( $@V_{CC} = 2.3\text{ V}$ )
  - $\pm 12\text{ mA}$  ( $@V_{CC} = 2.7\text{ V}$ )
  - $\pm 24\text{ mA}$  ( $@V_{CC} = 3.0\text{ V to }5.5\text{ V}$ )

### Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
RD74LVC14BFPEL	SOP–14 pin (JEITA)	FP–14DAV	FP	EL (2,000 pcs/reel)
RD74LVC14BTELL	TSSOP–14 pin	TTP–14DV	T	ELL (2,000 pcs/reel)

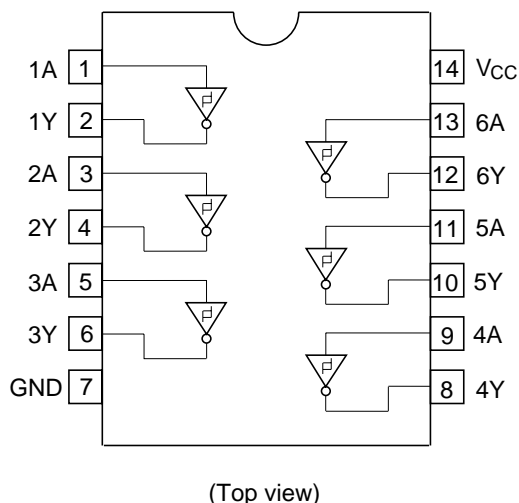
### Function Table

Input A	Output Y
L	H
H	L

H : High level

L : Low level

## Pin Arrangement



## Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage range	$V_{CC}$	-0.5 to 7.0	V	
Input diode current	$I_{IK}$	-50	mA	$V_I = -0.5$ V
Input voltage	$V_I$	-0.5 to 7.0	V	
Output diode current	$I_{OK}$	-50	mA	$V_O = -0.5$ V
		50		$V_O = V_{CC} + 0.5$ V
Output voltage	$V_O$	-0.5 to $V_{CC} + 0.5$	V	
Output current	$I_O$	$\pm 50$	mA	
$V_{CC}$ , GND current / pin	$I_{CC}$ or $I_{GND}$	100	mA	
Storage temperature	$T_{stg}$	-65 to +150	°C	

Note: The absolute maximum ratings are values, which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

## Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	$V_{CC}$	1.5 to 5.5	V	Data hold
		1.65 to 5.5		At operation
Input / Output voltage	$V_I$	0 to 5.5	V	A
	$V_O$	0 to $V_{CC}$		Y
Operating temperature	$T_a$	-40 to 85	°C	
Output current	$I_{OH}$	-4	mA	$V_{CC} = 1.65$ V
		-8		$V_{CC} = 2.3$ V
		-12		$V_{CC} = 2.7$ V
		-24		$V_{CC} = 3.0$ V to 5.5 V
	$I_{OL}$	4	mA	$V_{CC} = 1.65$ V
		8		$V_{CC} = 2.3$ V
		12		$V_{CC} = 2.7$ V
		24		$V_{CC} = 3.0$ V to 5.5 V

## Electrical Characteristics

Item	Symbol	V <sub>CC</sub> (V)	Ta = -40 to 85°C		Unit	Test Conditions
			Min	Max		
Threshold voltage	V <sub>T</sub> <sup>+</sup>	1.65	0.4	1.3	V	
		1.95	0.6	1.5		
		2.3	0.8	1.7		
		2.5	0.8	1.7		
		2.7	1.0	2.0		
		3.0	1.2	2.2		
		3.6	1.5	2.4		
		4.5	1.6	2.6		
		5.5	2.0	3.0		
	V <sub>T</sub> <sup>-</sup>	1.65	0.15	0.85	V	
		1.95	0.25	0.95		
		2.3	0.4	1.2		
		2.5	0.4	1.2		
		2.7	0.4	1.4		
		3.0	0.6	1.5		
		3.6	0.8	1.8		
		4.5	1.0	2.0		
		5.5	1.4	2.4		
Hysteresis voltage	ΔV <sub>T</sub>	1.65	0.10	1.15	V	V <sub>T</sub> <sup>+</sup> - V <sub>T</sub> <sup>-</sup>
		1.95	0.15	1.25		
		2.3	0.25	1.3		
		2.5	0.25	1.3		
		2.7	0.3	1.1		
		3.0	0.4	1.2		
		3.6	0.4	1.2		
		4.5	0.4	1.2		
		5.5	0.4	1.2		
Input voltage	V <sub>OH</sub>	1.65 to 5.5	V <sub>CC</sub> -0.2	—	V	I <sub>OH</sub> = -100 μA
		1.65	1.2	—		I <sub>OH</sub> = -4 mA
		2.3	1.7	—		I <sub>OH</sub> = -8 mA
		2.7	2.2	—		I <sub>OH</sub> = -12 mA
		3.0	2.4	—		
		3.0	2.2	—		I <sub>OH</sub> = -24 mA
		4.5	3.8	—		
	V <sub>OL</sub>	1.65 to 5.5	—	0.2	V	I <sub>OL</sub> = 100 μA
		1.65	—	0.45		I <sub>OL</sub> = 4 mA
		2.3	—	0.7		I <sub>OL</sub> = 8 mA
		2.7	—	0.4		I <sub>OL</sub> = 12 mA
		3.0	—	0.55		I <sub>OL</sub> = 24 mA
		4.5	—	0.55		
	Input current	I <sub>IN</sub>	0 to 5.5	—	±5.0	μA
Quiescent supply current	I <sub>CC</sub>	2.7 to 3.6	—	±5.0	μA	V <sub>IN</sub> = 3.6 V to 5.5 V
		2.7 to 5.5	—	5.0		V <sub>IN</sub> = V <sub>CC</sub> or GND
	ΔI <sub>CC</sub>	2.7 to 3.6	—	500	μA	V <sub>IN</sub> = one input at (V <sub>CC</sub> -0.6)V, other inputs at V <sub>CC</sub> or GND

## Switching Characteristics

Item	Symbol	V <sub>CC</sub> (V)	Ta = -40 to 85°C			Unit	From (Input)	To (Output)
			Min	Typ	Max			
Propagation delay time	t <sub>PLH</sub>	1.8±0.15	1.0	—	11.0	ns	A	Y
	t <sub>PHL</sub>	2.5±0.2	1.0	—	7.8			
		2.7	1.0	—	7.5			
		3.3±0.3	1.0	—	6.4			
		5.0±0.5	1.0	—	6.0			
Between output pins skew*1	t <sub>OSLH</sub>	1.8±0.15	—	—	—	ns		
	t <sub>OSHL</sub>	2.5±0.2	—	—	—			
		2.7	—	—	—			
		3.3±0.3	—	—	1.0			
		5.0±0.5	—	—	1.0			
Input capacitance	C <sub>IN</sub>	3.3	—	5.0	—	pF		

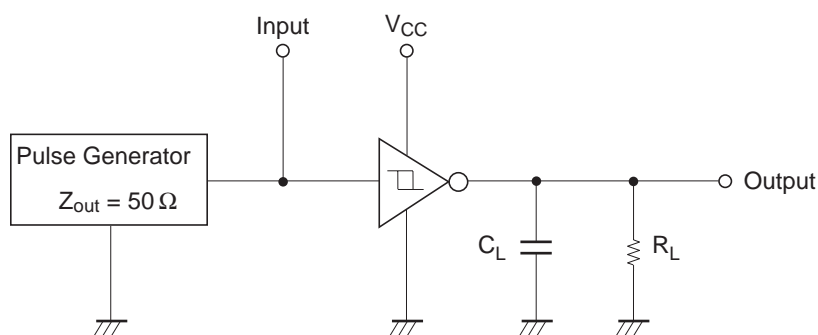
Note: 1. This parameter is characterized but not tested.

$$t_{OSLH} = |t_{PLHm} - t_{PLHn}|, t_{OSHL} = |t_{PHLm} - t_{PHLn}|$$

## Operating Characteristics

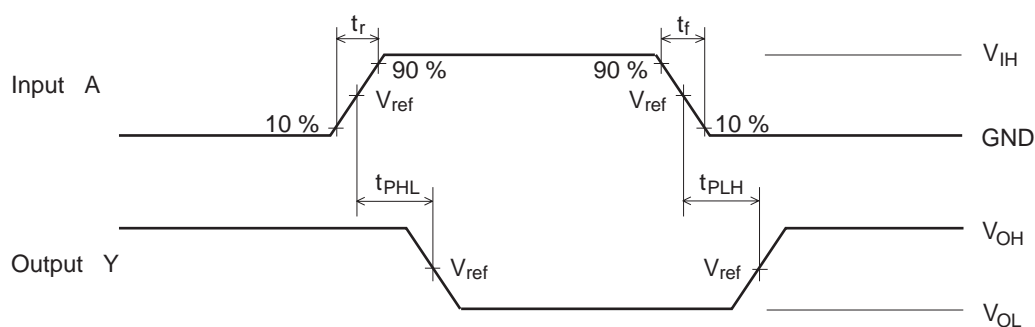
Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Unit	Test conditions
			Min	Typ	Max		
Power dissipation	C <sub>PD</sub>	1.8	—	16	—	pF	f = 10 MHz
Capacitance		2.5	—	18	—		
		3.3	—	20	—		
		5.0	—	25	—		

## Test Circuit



Note: 1.  $C_L$  includes probe and jig capacitance.

## Waveforms



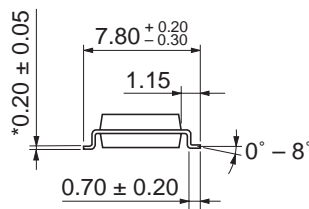
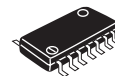
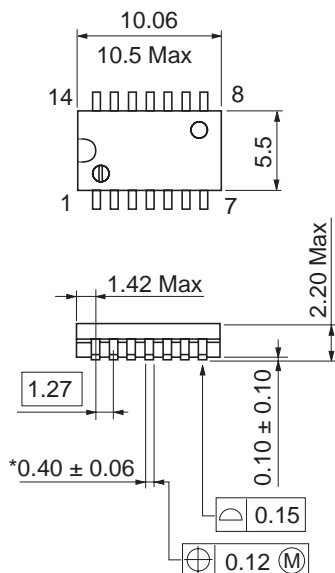
V <sub>CC</sub> (V)	INPUTS		V <sub>ref</sub>	C <sub>L</sub>	R <sub>L</sub>
	V <sub>IH</sub>	t <sub>r</sub> /t <sub>f</sub>			
V <sub>CC</sub> = 1.8±0.15 V	V <sub>CC</sub>	≤ 2 ns	1/2 V <sub>CC</sub>	30 pF	1.0 kΩ
V <sub>CC</sub> = 2.5±0.2 V	V <sub>CC</sub>	≤ 2 ns	1/2 V <sub>CC</sub>	30 pF	500 Ω
V <sub>CC</sub> = 2.7 V	2.7 V	≤ 2.5 ns	1.5 V	50 pF	500 Ω
V <sub>CC</sub> = 3.3±0.3 V	2.7 V	≤ 2.5 ns	1.5 V	50 pF	500 Ω
V <sub>CC</sub> = 5.0±0.5 V	V <sub>CC</sub>	≤ 2.5 ns	1/2 V <sub>CC</sub>	50 pF	500 Ω

Note: 1. Input waveform : PRR = 10 MHz, duty cycle 50%.

## Package Dimensions

As of January, 2003

Unit: mm

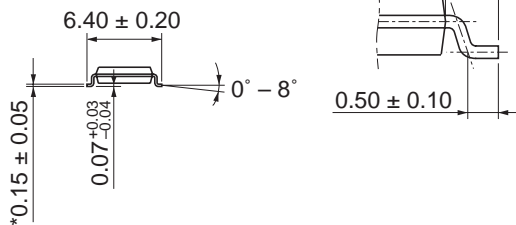
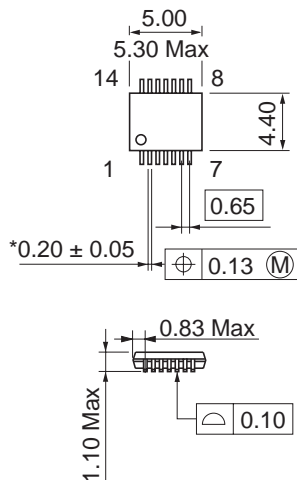


\*Ni/Pd/Au plating

Package Code	FP-14DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.23 g

As of January, 2003

Unit: mm



\*Ni/Pd/Au plating

Package Code	TTP-14DV
JEDEC	—
JEITA	—
Mass (reference value)	0.05 g

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